

1. A cored electrode for arc welding, said electrode having a core in which the fill material includes a manganese-containing composite particle.
2. The electrode of claim 1 wherein the composite particle contains manganese in admixture with a shielding material.
3. The electrode of claim 2 wherein the shielding material is  $\text{TiO}_2$ .
4. <sup>Sub A3</sup> ~~The~~ electrode of claim 3 wherein the shielding materials is rutile.
5. The electrode of claim 4 wherein the shielding material is anastace.
6. The electrode of claim 1 wherein the wire contains at least about 0.5% by weight manganese.
7. The electrode of claim 2 wherein the composite particle contains manganese encapsulated in a coating of said shielding material.
8. The electrode of claim 2 wherein the composite particle is made up of manganese particles dispersed in a matrix of the shielding material.
9. The electrode of claim 1 wherein the composite particle itself contains about 15 to 40% manganese based on total particle weight.
10. The electrode of claim 1 wherein the electrode is formulated for welding on mild steel and has the following composition in approximate percent by weight:

Sub A3

Constituent	Mild Steel
C	0.0-0.12
Mn	0.5-3.0
Si	0.0-2.0
Ti	0.05-0.7
B	0.0-0.1
Cr	0.0-0.4
Ni	0.0-0.5
Mo	0.0-0.1
V	0.0-0.5

Al	0.0-0.5
Cu	0.0-0.1
Mg	0.0-0.5
Fe	01.48-99.45

11. The electrode of claim 1 wherein the electrode is formulated for welding on low alloy steel and has the composition in approximate percent by weight.

Constituent	Low Alloy
C	0.0-0.13
Mn	0.5-3.75
Si	0.0-2.0
Ti	0.05-0.7
B	0.0-0.1
Cr	0.0-10.5
Ni	0.0-3.75
Mo	0.0-1.2
V	0.0-0.25
Al	0.0-0.5
Cu	0.0-0.75
Mg	0.0-0.5
Fe	75.87-99.45

12. A method for arc welding which comprises providing a cored electrode having a core of fill material including a composite particle containing manganese, and applying a voltage to said electrode upon contacting a work piece to cause said electrode to melt and form a weld metal bead.
13. The electrode of claim 12 wherein the composite particle contains manganese in admixture with a shielding material.
14. The method of claim 13 where a shielding gas is supplied to the point at which the electrode contacts the work piece and the shielding gas consists of argon
15. The method of claim 13 wherein the electrode contains magnesium and a shielding gas is supplied to the point of contact between the electrode and the workpiece and the shielding gas is a mixture of argon and carbon dioxide.

16. The method of claim 11 wherein the method is further characterized in that the fume produced upon applying the voltage contains reduced amounts of manganese.

17. The method of claim 16 wherein the fume contains less than 7% ppm manganese.

18. A method for reducing the amount of manganese in a fume generated during arc welding which comprises incorporating manganese in the core of a welding electrode as a composite particle of manganese and a shielding material.

19. A composite particle comprising manganese particles in a matrix of titanium dioxide particles.

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